Corporate cash hoarding and corporate governance mechanisms: Evidence from Borsa Istanbul

Abstract:

This study aims to examine the impact of corporate governance mechanisms on the cash hoarding decision. The study focuses on BIST100 non-financial firms listed on Borsa Istanbul over the period from 2010 to 2014. The study finds that firms with larger size of board of directors are more likely to hoard cash than firms with smaller board size. However, it finds firms with larger size of audit committee are more likely to hold less cash than firms with smaller audit committee size. Besides, it finds that firms with larger percent of independent directors are more likely to hoard more cash than firms with smaller percent of independent directors. It, also, finds that when the CEO of a firm is also the chairman, the firm tends to hoard more cash. Further, the study finds that firms audited by non-big auditor are more likely to hold more cash than firms audited by big auditor. The results suggest that firms with good corporate governance mechanisms (except for percent of independent directors) are less likely to hoard cash.

Keywords: Cash hoarding; Corporate governance; Turkish firms

1. Introduction

Due to market imperfections, external funds cannot be obtained easily and hoarding cash becomes crucial for firms. Firms need cash in order to carry out their financing, investing and operating activities. There are number of reasons that encourages firms to hoard cash. First, firms are likely to face transaction costs when they raise funds externally. These costs could be avoided by using cash reserves. Furthermore, cash reserves eliminate the need of asset liquidation to obtain funds. Second, cash reserves could be used in order to finance the investments and keep operating. Also, cash hoardings are beneficial for shareholders. Because, cash hoarding avoid dividend cuts during the periods with cash flow shortages (Saddour, 2006). Furthermore, hoarding cash reduce the cash-flow uncertainty because companies can meet not expected contingencies. JP Morgan (2005) states that "The choice of a company to hold cash to meet the objective of ensuring greater levels of financial flexibility and so it can capture growth opportunity without the risk of being subject to financial constraints". However, hoarding cash could create conflict of interests between managers and shareholders which creates an agency motive.

There is a limited number of studies that investigates the corporate cash hoarding decisions of firms. Prior research has examined the determinates of corporate cash hoarding in number of countries such as Canada, United Kingdom, United States, France, Pakistan, Switzerland, Germany, Japan, Iran, China and ASEAN Countries. However, none of prior research has examined the impact corporate governance mechanisms on cash hoarding in Turkey. Therefore, this work is encouraged by the fact that none of the prior studies in Turkey have studied the relationship between corporate cash hoarding and corporate governance mechanisms. Prior studies in Turkey focus on the period before global financial crises and examine the impact of firm specific characteristics such as profitability and capital expenditure on the corporate cash holding (e.g.,

Uyar & Kuzey, 2014). Thus, this study aims to fill this gap by investigating the effect of specific governance mechanisms on the cash hoarding decision of Turkish listed firms, particularly, after the period of global financial crisis.

This study contributes to the literature in terms of corporate cash hoarding and corporate governance mechanisms. The study is the first to investigate the impact of corporate governance mechanisms on the corporate cash hoarding decision within the Turkish firms over the period of 2010-2014. The study finds that firms with larger size of board of directors are more likely to hold more cash than firms with smaller board of directors. In addition, it finds that firms with larger percent of independent directors their board of directors are more likely to hold more cash than firms with smaller percent of independent directors in their boards. It, also, finds that when the CEO of a firm is also the chairman, the firm tends to hold more cash. besides, the results indicate that firms with larger size of audit committee are more likely to hold less cash than firms with smaller size of audit committee. However, the study finds non-significant relationship between cooperate cash hoardings and both frequency of board meetings and family ownership. Further, the study finds that firms audited by non-big auditor are more likely to hold more cash than firms audited by big auditor. The results suggest that firms with good corporate governance mechanisms are less likely to hold cash.

The reminder of the paper is structured as follows. Section 2 provides the theoretical framework; It explains different theories of cash hoarding and reviews the literature to formulates the research hypotheses; Section 3 details the research design; Section 4 reports the results; Section 5 presents the conclusion.

2. Theoretical framework

2.1 Theories

The theoretical expectations for managers' decision to hold cash are based on the following theories; *trade-off, pecking order and free cash flow theories*

2.1.1 Trade-off Theory

The trade-off theory was, firstly, proposed by Baumol (1952) and Tobin (1956) and was extended by Miller & Orr (1966). The trade-off theory argues that firms maximize their values by considering the marginal costs and marginal benefits of hoarding cash. (Opler et al., 1999). Ferreira & Vilela (2004) emphasized that hoarding cash reserves reduces the probability of experiencing financial distress, make it possible for a firm to apply optimal investment policy and reduces the costs of liquidation of assets or external fundraising. On the other hand, the marginal cost of hoarding cash is the opportunity cost of forgone investments with higher returns (Opler et al., 1999; Ferreira & Vilela, 2004). In addition, if managers hoard cash in order to increase the firm size rather than maximizing shareholder's wealth, the company could face the agency cost of hoarding cash (Han & Qiu, 2007).

2.1.2 Pecking Order Theory

The pecking order (or financial hierarchy) theory was developed by Myers & Majluf (1984).This theory aims to minimize the costs of information asymmetry[1] and other costs of financing (Custodio et al., 2005; Ferreira & Vilela, 2004). Thus, this theory suggests that firms follow a pecking order of financing to minimize costs related to information asymmetry. Therefore,

[1] The term of "asymmetric information" represents the unequal level of information between two parties within a transaction and it could be solved by providing information to external environment. Because of asymmetric information, markets become inefficient due to insufficient information provided to investors to make their decisions.

companies finance their investments, firstly, by using internal sources such as retained earnings, then, low risk debt and, finally, with high risk debt rather than using equity financing (Myers & Majluf, 1984). In addition, when a company become bankrupt, the debt holders are paid first and shareholders get the remaining amount. The equity financing is the last choice because firms face higher costs due to information asymmetries, when issuing new shares. Thus, cash can be seen as an outcome of the different financing and investment decisions proposed by the hierarchal pattern of financing (Dittmar et al., 2003). Ferreira and Vilela (2004) claim that cash can be used for financing investments to pay firm's debt and in turn stockpile cash. Dittmar et al. (2003) also detect that firms with high level of cash flows are those to distribute dividends, apply for debt financing, and as a result hoard cash.

2.1.3 Free Cash Flow Theory

The free cash flow theory of Jensen (1986) mainly focuses on the shareholder-manager relationship. Free cash flow is the remaining amount when the capital expenditures are subtracted from operating cash flow. According to Jensen (1986), managers desire to increase the firm size with the cash hoardings of the company by investing in assets. By doing this, managers gain additional power on the investment decisions of the firm. Therefore, cash reserves make it possible for managers to make the investments that investors are not willing to finance. Additionally, when a firm has enough cash hoardings, it is not required to raise funds externally and provide information on their future projects to external environment. This situation allows manager to use the cash hoardings in a way that suits their own interest and reduces the pressure for good performance (Ferreira & Vilela, 2004; Custodio et al., 2005). On the other hand, shareholders seek to maximize their wealth with dividend pay-outs. Finally, management may choose to hoard cash

because of the unwillingness to pay dividends to shareholders. Yet, managers must find ways to invest the cash and this behaviour may result in unworthy investments (Opler et al., 1999).

2.2 Literature and hypotheses development

This section critically evaluates the prior research in terms of the association between corporate governance mechanisms and hoarding cash in order to development the research hypotheses.

2.2.1 Cash hoarding and size of board of directors

Jensen (1993) suggests that larger boards of directors are more likely to be dominated by CEOs. This may be because a number of board members prefers not to criticize the decisions on management. Consequently, Boubaker et al. (2013) argue that the size of a board negatively affects the co-operation and communication between the board members. This is in turn decreases the monitoring quality of the board. In addition, prior research (e.g., Lipton and Lorsch, 1992; Yermack, 1996) emphasize that larger board size is in-effective in making decision.

Thus, prior research finds that firms with larger board size are more likely to hold excessive cash reserves, allows managers to make investments that are benefitable for them, as free cash flow theory suggests (Ferreira and Vilela, 2004). In addition, Bokpin et al. (2011) find a positive relationship between board size and cash hoardings, which may occur because of the willingness to pay board remunerations. Prior empirical research documents positive or non-significant relationship between board size and the decision to hold cash. For instance, Lee and Lee (2009), Bokpin et al. (2011) and Gill and Shah (2012) find positive relationship between the size of board of directors and cash hoarding. However, Boubaker et al. (2013) failed to find a significant relationship between board size and cash hoardings. Therefore, the current study develops the following hypothesis:

***H1*:** The larger the boar size, the higher the cash value held by firms

2.2.2 Cash hoarding and Frequency of Board Meetings

Agency theory argues that board of directors should monitor the managers in order to make sure that the interests of managers are in line with the interests of shareholders. (Belkhir, 2009; Dalton et al., 2007). Therefore, the process of monitoring the managers is one of the most important duties of board of directors. Jiraporn et al. (2009) stated that board meetings have a significance for board members to carry out their monitoring process more effectively. In addition, some researches revealed that the frequency of board meetings significantly affect the effectiveness of monitoring activities of board members (Vefeas, 2000; Ramos and Olalla, 2011; Hsu and Petchskulwong, 2010). As mentioned before, managers and shareholders of a company are expected to have opposite tendencies on the usage of cash hoardings, as agency theory suggests. Managers tend to hold the cash in order to be used for their benefit; however, shareholders force them to distribute the cash hoardings as dividends. By this reason, the frequency of board meetings is expected to affect the effectiveness of monitoring positively, which results in less cash hoardings. However, there is a noticeable absence of studies that investigated the relationship between the frequency of board meetings and the value of cash hoardings. Therefore, the following hypothesis is developed

H2: The higher the frequency of board meetings, the lower the cash hoardings held by firms

2.2.3 Cash hoarding and Board Independence

Lee and Lee (2009) argued that non-duality of CEO, smaller boards and higher proportion of independent directors within the board are the main components of a well-structured board of directors. A well-structured board of directors is more able to resist the desires of hoarding more

cash reserves by other managers, to pursue their own benefit. Also, because of the absence of any financial interest, other than remunerations, independent directors within the board are expected to be more objective than other board members (Adams et al., 2010). In addition, independent directors mainly compete on their remunerations, which is significantly affected by the performance of the firm. By this reason, independent directors are likely to monitor the actions, within the company, better than other board members (Yermack, 2004). Improved monitoring leads to improved firm performance decreased managerial entrenchment and less business opportunism (Lee and Lee, 2009). Also, Kim et al. (2007) emphasized that it is expected for independent directors to protect minority shareholders.

These arguments show that presence of independent directors leads to greater protection of minority shareholders, better monitoring on the actions of management and prevention of hoarding excessive cash reserve for the benefit of managers and owners. Therefore, board independence is expected to affect cash hoardings negatively. Empirically, prior research report mixed results in terms of the association between independent directors and cash hoarding. For instance, some prior studies find negative association between existence of independent directors in the board and cash hoarding (e.g., Lee and Lee 2009; Boubaker et al., 2013). However, Chen and Chuang (2009) document positive association between outside directors and cash hoardings. The current study suggest that independent directors are likely to monitor the actions, and thus, negative association is expected between independent directors and cash hoarding. Therefore, the following is developed:

> ***H3*:** The higher the percent of independent directors in the board, the lower the cash hoardings held by firms

2.2.4 Cash hoarding and role duality of CEO

Free Cash Flow theory argues that when the roles of CEO and chairman are combined, the quality of the board is likely to be affected negatively and may result in non-disagreement of the fiduciary duty of board members (Fama and Jensen, 1983; Jensen 1993). Additionally, the duality role of a CEO affects the effectiveness of a board, because the position of CEO is more suitable than other board members to obtain special information about the firm (Daily and Dalton, 1997). Consequently, the CEOs, who are also the chairman of the company, may prefer not to share critical information, due to the desire of self-entrenchment, that is needed for the assessment of management quality (Brockmann et al., 2004). Therefore, it is expected for CEO role duality to adversely affect the quality of board monitoring, which results in inability to detect the actions carried out by board members for their own benefit (Lipton and Lorsch, 1992; Goyal and Park, 2002). In addition to these, Gul and Leung (2004) find that the role duality of CEO affect the outcome of a firm (e.g., less voluntary corporate disclosures).

The above arguments suggest that when the CEO is also the chairman of the company, board of directors may not be able to resist managerial discretion on the cash hoardings of the firm accompanied by concentrated ownership. Additionally, the role duality of CEO allows the controlling shareholders to hold higher cash reserves for their own benefit, which supports a positive relationship between CEO duality and cash hoardings (Boubaker et al., 2013). Moreover, Dahya and Travlos (2000) argue that dual-responsibility encourages CEOs to act in line with the interests of managers and hoarding excessive cash reserves help managers to protect their positions. Consistently, Boubaker et al. (2013) on French firms and Gill and Shah (2012) on Canadian firms supports this relationship. Therefore, the current study develops the following hypothesis:

***H4*:** Existence of role duality of CEO leads to higher cash hoarding held by firms

2.2.5 Cash hoarding and Family-control

Free cash flow theory suggests that when the family hold controls over a firm accompanied with excess control rights, family can use the cash in a way that suits family members' own interest, even if it is not benefitable for outside investors (La Porta et al., 1999). Additionally, involvement of controlling family members in management increases the discretionary power of family members, and combines management and monitoring processes (Anderson and Reeb, 2003). Consistently, Kuan et al. (2011) support this argument and emphasize that family-controlled firms' decisions are taken typically by considering the wants and needs of family members, with the help of less monitoring by minority shareholders. These arguments result in non-detection of business opportunism. Based on these arguments, family-controlled firms are expected to hoard more cash in order to pursue their own interest, without maximizing shareholder wealth. This positive relationship is supported by Liu et al. (2015). On the other hand, Kuan et al. (2012) show that the relationship between family-control and cash hoardings is non-monotonic. They find that in low cash hoarding firms, family member CEOs tend to hold more cash than outsider CEOs. However, in high cash hoarding firms, family member CEOs are found to hold less cash than outsider CEOs (Kuan et al., 2012). Furthermore, Boubaker et al. (2013) reveal that, in well- governed firms, the relationship between family-control and cash hoardings is negative, which shows that the board of well-governed firms could resist the attempts to hold high cash reserves. Therefore, the following hypothesis is developed

***H5*:** Existence of family control leads to higher cash hoarding held by firms

2.2.6 Cash hoarding and size of audit committee

Agency theory suggests that the conflicts between managers and shareholders, generally, results in decisions that meets with the interests of top managers (Jensen and Meckling, 1976). The decisions against the shareholders' interests are more common when the monitoring quality is low (Fama and Jensen, 1983). In order to improve the monitoring quality of the board and resolve these conflicts, audit committee has a critical role (Klein, 2002). Anderson et al. (2004) emphasize that the responsibilities of audit committees include monitoring the internal control, which enhances the reliability of financial reports. In addition, MeMullen (1996) show that there are fewer shareholder lawsuits, regarding the conflicts between agents and shareholders, for the companies with audit committees.

The size of an audit committee can affect its effectiveness. The report of Blue Ribbon Committee (1999) suggests a minimum number of three members for the audit committees. The firms with small audit committees are expected to suffer from ineffective monitoring due to limited skills and knowledge (Al-Matar et al., 2014). On the other hand, relatively larger audit committees have an advantage of diversified knowledge base (Karamanou and Vafeas, 2005), which improves the quality of monitoring. However, when the audit committees become too large its effectiveness are expected to face diffusion of responsibility and process losses (Karamanou and Vafeas, 2005).

There is a noticeable absence of studies that investigated the relationship between the size of the audit committees and cash hoardings. However, the firms with relatively larger audit committees are likely to have better monitoring, due to aforementioned factors, which results in less cash hoardings. Therefore, the following hypothesis is developed

H6: The larger the audit committee size, the lower the cash hoardings held by Turkish firms

3. Research design

3.1 Empirical model

In order to investigate our hypotheses, the study controls for some economic environment variables that may affect the value of a firm cash hoarding. These variables include: firm age, size, profitability, liquidity, leverage, dividends, and capital expenditure. Besides, there may be a variation in the value of cash held by firms over the sample period. Therefore, the year-fixed effect is used to control for variations in the cash hoarding value over the sample period. Finally, industry fixed effect is used to control for variations in the value of cash hoardings among different industries. The following summarizes the empirical model (Model 1) and Table (1) elaborates the definitions and measurements of the variables.

$$CASH_{it} = \beta_0 + \beta_1 BSIZE_{it} + \beta_2 BMEET_{it} + \beta_3 BIND\%_{it} + \beta_4 DUALTY_{it} + \beta_5 FMLY_{it} + \beta_6 ADTCMT_{it} + \beta_7 FA_{it} + \beta_8 FS_{it} + \beta_9 FPROFT_{it} + \beta_{10} FLIQDT_{it} + \beta_{11} FLEVG_{it} + \beta_{12} FDIVDNT_{it} + \beta_{13} FCAPEX_{it} + Year\ Fixed\ Effect + Industry\ Fixed\ Effect + \varepsilon \quad (1)$$

Where:

β_0	The regression intercept
$\beta_1 \ldots \beta_{13}$	The regression coefficients
ε	The error term

Table (1): Variables: Definitions and measurements

Variable	Label	Measurement
Cash hoarding	CASH	The natural logarithm value of ratio of cash and cash equivalents to total assets
Board size	BSIZE	The number of directors on the firm board of directors
Board Meetings	BMEET	The frequency of board meetings board meetings held within a year

Board Independence	BIND%	The percentage of independent directors to the total number of directors in a firm board of directors .
CEO duality	DUALITY	Dummy variable that takes the value of 0 if the chairman and CEO is the same and 0 otherwise.
Family control	FMLY	Dummy variable that takes the value of 1 if family-owned shares are more than or equal to 10% and takes the value of 0 if family-owned shares are less than 10%.
Size of the Audit Committee	ADTCMT	The number of members of a firm audit committee
Firm age	FA	The number of years passed from firms' foundation to the measurement year
Firm size	FS	The natural logarithm of firm's total assets
Profitability	FPRFT	Earnings before interest and taxes (EBIT) divided by total assets (Also called Return on Assets - ROA)
Liquid asset substitutes	FLIQDT	Net working capital minus cash and cash equivalents divided by total assets
Leverage	FLEVG	Total liabilities divided by total assets
Dividends	FDIVDNT	If dividends paid =1 If not= 0
Capital expenditures	FCAPEX	The ratio of capital expenditures to total assets
Notes: This Table provides the definitions and measurements of variables in model (1).		

3.2 Sample selection and data collection

Our investigation focuses on BIST100 listed Turkish firms listed on Borsa Istanbul. The analysis covers a period from 2010 to 2014. This is because there are noticeable absence of studies in terms of cash hoarding after the period of financial crises (e.g., 2009). Following prior research (e.g., Bates et al., 2009) financial firms[2] are excluded due to their unique motivates for hoarding cash. Besides, we exclude firms with missing data in terms of corporate governance variables. This

[2] Financial firms include banks, insurance companies, real estate investment trusts (REITs) and investment funds

screaming leaves us with 360 firm-year observations. Table (1) shows the final sample sorted by years and industries.

Table (2): Sample selection and allocation over years and industry		
Panel A: Sample distribution over years		
Years	**Freq.**	**Percent**
2010	72	20
2011	72	20
2012	72	20
2013	72	20
2014	72	20
Total	**360**	**100**
Panel B: Sample distribution over industries		
Industries	**Freq.**	**Percent**
Manufacturing	181	46.94
Electricity, oil and gas	22	6.11
Technology	15	4.17
Consumer services	67	21.94
Transportation and Telecommunication	32	8.89
Construction and public works	23	6.39
Mining	20	5.56
Total	**360**	**100**
Notes: This Table provides the distribution of the sample among years and industries. Our sample consists of 360 firm-year observations distributed over 5 years period (2010-2014) and 7 industries.		

All financial data are collected from DataStream database. Corporate governance data are collected manually from the Public Disclosure Platform (www.kap.gov.tr) and annual reports of firms. Annual reports are collected from companies' official websites and Public Disclosure Platform (www.kap.gov.tr).

4. Results

4.1 Descriptive statistics and correlation analysis

The descriptive statistics of the variables are exhibited in table (3). Panel A shows the descriptive statistics of the continuous variables. While panel b reports the frequencies of dummy variables. Panel A of table 3 reports a mean value of logarithm of cash hoarding ratio of -1.109 for Turkish firms. The natural logarithms of cash hoardings are between the range of -4.063 and -0.133 with a standard deviation of 0.558. These values indicate that the range of cash ratios is considerably wide, however, the deviation from the mean value is not high.

In terms of corporate governance variables, Panel A of table 3 reports that the average board size of board of directors is 9 (8.4) members with the maximum board size of 15 members and minimum size of 4 members. The average frequency of board meetings of the board of directors is 1.232 meetings with minimum number of meeting of 1 meeting and maximum number of 3 meetings. The mean ratio of independent board members to the total number of board members is 17%. Because there is an absence of governance regulation in Turkish firms during 2010 & 2011, most of the companies did not included independent directors in their boards, during the years of 2010 and 2011. Therefore, the minimum value for board independence is 0% particularly in 2010 & 2011. This situation makes it possible to evaluate the effect of independent board members on the cash levels of the firms. In terms if audit committee, the average number of members of audit committee is 3 (2.2) members with minimum number of member os 1 and maximum number of 7 members.

Panel b of table 3 reports the frequencies of dummy variables. Panel b shows that only at 16.4% of the CEOs in the sample firms act as chairman in the board of directors. This relatively small

percent indicate that CEO-Chairman duality is not a common practice in the Turkish listed firms. In terms of family ownership, 33.3% of Turkish firms are owned by family members. During our sample period, 70.8% of the firms pay dividends to their shareholders. While, 29.2% did not pay any dividends during this period. In terms of auditor type, 83.1% of the firms are audited by one of the big auditing firms, while, only 16.9% are audited by non-big auditor.

Table (3): Descriptive statistics of variables

Panel A: Descriptive - Continues variables

	Mean	**Std. Dev.**	**Min.**	**Max.**
Cash Hoarding (CASH)	-1.109	0.558	-4.063	-0.133
Cash/Total assets	0.133	0.123	0.000	0.736
Board size	8.406	2.262	4.000	15.000
Board meetings	1.232	0.491	1.000	3.000
Board independence	0.179	0.151	0.000	0.429
Audit committee	2.278	0.725	1.000	7.000
Firm age	38.569	14.456	11.000	78.000
Firm size	9.316	0.636	7.677	11.363
Firm profitability	0.082	0.084	-0.195	0.518
Liquidity	0.044	0.170	-0.398	0.644
Firm leverage	0.483	0.224	0.026	1.039
Capital expenditure [CAPEX]	0.069	0.062	0.000	0.437

Panel B: Frequencies- Dummy variables

Variable	**Dummies**	**Freq.**	**Percent**
CEO duality	0	301	83.6
	1	59	16.4
Family ownership	0	240	66.7
	1	120	33.3
Dividends payment	0	105	29.2
	1	255	70.8
Auditor	0	61	16.9
	1	299	83.1

Notes: This table reports the descriptive statistics of continues variables in Panel A. While Panel B reports the frequencies of dummy variables.

Variables' definitions and measurements are the same as summarized in table (1).

Table 4 reports the Pearson correlation matrix which is used to measure the strength and direction of the linear association between any pair of variables. It provides evidence that the value of hoarding cash is positively correlated with firm family control, firm age, firm size, firm profitability and firm dividends. However, the cash hoarding value is negatively associated with firm liquidity and firm leverage. These findings indicate that the management decision to hold cash is affected by firm corporate governance mechanisms and firm characteristics.

In addition to measuring the strength and direction of the linear association between any pair of variables, the Pearson correlation matrix is an initial tool to detect multi-collinearity. Gujarati and Porter (2009) indicate that variables are highly correlated if the correlation is greater than 0.80. Consequently, the multi-colinearity among variables is acceptable if the correlation coefficients are less than 0.80. Table 4 presents Pearson correlation matrix among dependent and all explanatory variables of the current study. The Pearson correlation coefficients among all variables are relatively low, less than *0.80*, suggesting that there is no variable exhibit multi-collinearity problem.

Further check for multi-collinearity is performed by calculating the tolerance coefficients among variables (alternatively, Variance Inflation Factor or simply VIF), after carrying out the regression model. Statistically, the higher the correlation among variables, the higher the possibilities of the tolerance coefficients will approach to zero and the higher the possibilities to have multi-collinearity problem. If the tolerance of any variable is less than 0.1 (alternatively, VIF is more than 10), this suggests a multi-collinearity problem (Field, 2009). The values of tolerance and VIF test are tabulated with the regression results and indicate that there is no concern about this problem

Table (4): Correlation matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1) CASH	1.000													
(2) Board size	.029	1.000												
	.578													
(3)board meeting	-.048	-.005	1.000											
	.363	.922												
(4)independent	.033	.019	.039	1.000										
	.528	.723	.468											
(5)duality	-.004	-.199	-.057	-.033	1.000									
	.935	.000	.281	.528										
(6) family	.132	-.088	-.051	.055	-.138	1.000								
	.012	.096	.335	.295	.009									
(7)audit committee	.086	.082	.071	-.159	.048	-.162	1.000							
	.108	.125	.185	.003	.369	.002								
(8) age	.169	.083	-.049	.080	-.110	-.128	-.065	1.000						
	.001	.116	.352	.132	.037	.015	.223							
(9)size	.104	.276	.114	.195	-.172	.136	.066	.066	1.000					
	.049	.000	.032	.000	.001	.010	.216	.210						
(10) return	.243	-.081	.009	-.054	-.101	.112	-.018	-.005	-.129	1.000				
	.000	.126	.872	.304	.056	.033	.739	.930	.015					
(11) liquidity	-.105	-.039	-.058	-.036	-.022	-.175	.016	.113	-.512	.202	1.000			
	.047	.457	.274	.497	.680	.001	.758	.032	.000	.000				
(12) leverage	-.160	.240	.026	.067	.006	-.023	.014	-.102	.380	-.235	-.432	1.000		
	.002	.000	.621	.203	.910	.657	.789	.052	.000	.000	.000			
(13) dividends	.307	.034	-.023	.019	-.162	.091	-.009	.239	.147	.253	.078	-.161	1.000	
	.000	.520	.666	.718	.002	.086	.867	.000	.005	.000	.141	.002		
(14) capital expenditure	-.067	.005	.084	.000	.108	.055	.031	-.192	-.087	.167	-.103	.016	-.075	1.000
	.208	.926	.115	.995	.041	.295	.564	.000	.099	.001	.051	.756	.154	

Notes: This Table presents the Pearson Correlation Matrix among all variables.

Variables' definitions and measurements are the same as summarized in Appendix (2).

***, **, and * indicate significance at 0.01, 0.05, and 0.1, respectively.

4.2 Empirical results

Table (5) reports the multivariate results which are robust to year and industry fixed effects. The empirical results reveal that model (1) is statistically significant at 1% level of significance (P<.01) and the adjusted R-squared value 18.8%. These values imply a good overall model fit which indicate that the model explains some variation in cash hoarding.

The empirical results report the coefficient of board size (BSIZE) is 0.036 and is statistically significant at the 5% significance level (t = 2.547). This result indicates that hoarding cash is positively associated with size of board of directors, meaning that firms with larger board of directors are more likely to hold more cash than firms with smaller board of directors. Therefore, hypothesis H1 is accepted. This result is consistent with the free cash flow theory which suggests that larger boards of directors are more likely to have poor communication and cooperation, decrease in monitoring quality and ineffective decision making. These factors reduce the pressure for good performance, and encourages managers to stockpile more cash to be used for their own interests. The results are, also, consistent with some prior research (e.g., Lee & Lee, 2009; Bokpin et al., 2011; Gill & Shah, 2012).

The coefficient of board meetings (BMEET) is -0.020 and is not statistically significant at any significance level. This result indicates that hoarding cash is not associated with frequency of board of directors' meetings. Therefore, hypothesis H2 is rejected. The coefficient of board independence (BIND%) is 0.928 and is statistically significant at the 5% significance level (t = 2.111). This result indicates that hoarding cash is positively associated with the percent of independent directors in the board of directors, meaning that firms with larger percent of independent directors their board of directors are more likely to hold more cash than firms with smaller percent of independent

directors in their boards. Therefore, hypothesis H3 is rejected. This result is consistent with Chen and Chuang (2009) who document positive association between outside directors and cash hoardings. However, it is not consistent with some studies which find negative association between existence of independent directors in the board and cash hoarding (e.g., Lee and Lee 2009; Boubaker et al., 2013).

The coefficient of CEO duality (DUALITY) is 0.059 and is statistically significant at the 5% significance level (t = 2.081). This result indicates that hoarding cash is positively associated with the role duality of CEO, meaning that firms with existence of role duality of CEO are more likely to hold more cash than firms with nonexistence of role duality of CEO. Therefore, H4 is accepted. The result suggests that when the CEO of a firm is also the chairman, the firm tends to hold more cash. This finding supports free cash flow theory and the findings of some prior research such as Gill and Shah (2012) and Boubaker et al. (2013).

The coefficient of family control (FMLY) is 0.099 and is not statistically significant at any significance level. This result indicates that hoarding cash is not associated with family ownership Therefore, hypothesis H5 is rejected. The result is not consistent with Liu et al. (2015) who find that hoarding cash is positively associated with family ownership. The coefficient of size of audit committee (ADTCMT) is -0.084 and is statistically significant at the 5% significance level (t = -2.549). This result indicates that hoarding cash is negatively associated with the size of audit committee, meaning that firms with larger size of audit committee are more likely to hold less cash than firms with smaller size of audit committee. Therefore, H4 is accepted. The result suggests that firms with relatively larger audit committees are likely to have better monitoring, due to aforementioned factors, which results in less cash hoardings.

In terms of control variables, firm age is positively associated with the value of cash hoarding at 5% significance level suggesting that older firms hold more cash than newly established firms. In addition, there is an insignificant relationship between firm size and cash hoardings meaning that the size of a firm has no effect on the value of cash hoarding. In addition, firm profitability affects cash hoardings positively suggesting that firms with higher profitability level are more likely to hold more cash than firms with lower profitability level. Also, firm liquidity affects cash hoardings negatively and firm leverage has a significant negative effect on cash hoardings. Besides, firm dividends affect cash hoardings positively and firm capital expenditures affects cash hoardings negatively. These results suggest that the value of cash hoarding is affected by some firm specific characteristics.

Table (5): Empirical results of Model 1

	Independent Variables	**Pred. Sign**	**Coefficient (t-statistic)**	**P-Value**	**VIF (Tolerance)**
Intercept			-1.393 (-2.774)	.006	
Board size	BSIZE	+	.036 (2.547)	.011	1.395 (.717)
Board meetings	BMEET	-	-.020 (-.361)	.718	1.085 (.922)
Board independence	BIND%	-	.928 (2.111)	.035	6.202 (.161)
CEO duality	DUALITY	+	.159 (2.081)	.038	1.150 (.869)
Family ownership	FMLY	+	.099 (1.624)	.105	1.141 (.876)
Audit committee	ADTCMT	-	.084 (2.179)	.030	1.108 (.902)
Firm age	FA	+	.005 (2.549)	.011	1.184 (.845)
Firm size	FS	+	-.045 (-.773)	.440	1.961 (.510)
Firm profitability	FPRFT	+	1.443 (4.096)	.000	1.194 (.838)
Firm liquidity	FLIQDT	+	-.831	.000	1.729

			(-4.068)		(.578)
Firm leverage	FLEVG	+	-.391 (-2.702)	.007	1.434 (.697)
Firm dividends	FDIVDNT	-	.265 (4.061)	.000	1.250 (.800)
Firm Capital expenditure	FCAPEX	-	-1.015 (-2.141)	.033	1.183 (.846)
Year fixed effect			Yes		
Industry fixed effect			Yes		
F-test			5.772***		
Adjusted R- squared (%)			18.8		
No. of observations			360		
Notes: This Table reports the coefficients estimate of model (1). The dependent variable is CASH measured using the natural logarithm of the ratio of cash and cash equivalent to total assets at the end of the year. The *t-statistics* and *tolerance* are presented in parentheses.					
Variables' definitions and measurements are the same as summarized in Table (1).					
*, **, and *** indicate significance at 0.1, 0.05 and 0.01, respectively.					

4.3 Additional analysis

It is argued that big auditing firms provide higher quality audit compared to their counterparts because of their reputation, scale and expertise and they detect more of accounting irregularities in order to protect their valuable reputation. These arguments suggest that the big audit firms are more likely able to detect business opportunism on cash hoardings. Furthermore, trade-off theory suggests auditing reduces the information asymmetry between managers and investors by providing assurance for the financial statements. Accordingly, high-quality audits reduce information asymmetry to a relatively lower levels. Accordingly, firms audited by one of the big auditing firms are likely to have less information asymmetry costs when raising funds externally. By this reason, these companies are expected to hold less cash in order to mitigate the opportunity cost of hoarding cash, as suggested by trade-off theory.

However, there is a noticeable absence of studies that investigated the relationship between auditor choice and cash hoardings. Therefore, in this section we investigate the impact of audit firm size

on cash hoarding. To this end, the sample is divided into two sub-samples: firms audited by one of the Big 4 auditing firms (Big-N) and firms audited by a non-Big 4 auditor (Non-Big-N)[3]. Model (1) is run, separately, for the Big-N and Non Big-N Samples.

Table (6) reports the estimation of Model (1) for the Big N and non-big N samples I panels 1 & 2, respectively. The model is statistically significant at 1% for both samples. The adjusted R-squared value is 24.5% for the big N sample. This suggest that corporate governance explains 24.5% of the variations of cash hoarding when firms are audited by big auditor. While, adjusted R-squared value is 31.8% for the non-big N sample. This suggests that corporate governance explains 31.8% of the variations of cash hoarding when firms are audited by non-big auditor. Consequently, we can argue that firms audited by non-big auditor are more likely to hold more cash than firms audited by big auditor. The result is consistent with the trade-off theory which argue that firms audited by one of the big auditing firms are likely to have less information asymmetry costs when raising funds externally. By this reason, these companies are expected to hold less cash in order to mitigate the opportunity cost of hoarding cash.

Table (6): Big N vs non Big-N auditors

		Big-N Auditor			**Non-Big-N auditor**		
	Ind. Variables	**Coefficient** ***(t-statistic)***	**P-Value**	**VIF** ***(Tolerance)***	**Coefficient** ***(t-statistic)***	**P-Value**	**VIF** ***(Tolerance)***
Intercept		-.866 -1.870	.063		-6.162 -2.154	.037	
Board size	BSIZE	.033 2.553	.011	1.457 .686	.159 2.958	.005	1.882 .531
Board meetings	BMEET	-.017 -.314	.754	1.093 .915	.112 .648	.521	1.529 .654

[3] The Big-N are the four largest international professional services networks, offering audit, assurance, tax, consulting, advisory, actuarial, corporate finance, and legal services: wh PwC, Deloitte, Ernst & Young, and KPMG. Non Big-N are all auditors other than the Big-N. We measure audit firm size as a dummy variable that is equal to 1 if the firm is audited by one of the Big 4 auditing firms and 0 otherwise.

Board independence	BIND%	.972 2.465	.014	5.700 .175	-2.103 -1.022	.313	15.401 .065
CEO duality	DUALITY	.097 1.342	.181	1.241 .806	.626 2.081	.044	1.571 .636
Family ownership	FMLY	.079 1.398	.163	1.125 .889	.410 1.866	.069	1.827 .547
Audit committee	ADTCMT	-.095 -2.782	.006	1.113 .899	-.071 -.376	.709	1.437 .696
Firm age	FA	.003 1.864	.063	1.151 .869	.025 2.038	.048	2.846 .351
Firm size	FS	-.080 -1.503	.134	1.989 .503	.188 .643	.524	3.159 .317
Firm profitability	FPRFT	1.325 4.200	.000	1.207 .828	1.269 .733	.468	1.514 .660
Firm liquidity	FLIQDT	-1.387 -6.828	.000	1.966 .509	.782 1.165	.251	2.218 .451
Firm leverage	FLEVG	-.881 -6.044	.000	1.632 .613	1.154 2.623	.012	1.758 .569
Firm dividends	FDIVDNT	.120 1.852	.065	1.250 .800	.399 2.050	.047	1.503 .665
Firm Capital expenditure	FCAPEX	-.967 -2.079	.039	1.194 .838	-.651 -.454	.652	1.820 .550
Year fixed effect		Yes			Yes		
Industry fixed effect		Yes			Yes		
F-test		6.587***			2.560***		
Adjusted R- squared (%)		.245			.318		
No. of observations		293			57		

Notes: This Table reports the coefficients estimate of model (1) for Big N and non-Big N samples. The dependent variable is CASH measured using the natural logarithm of the ratio of cash and cash equivalent to total assets at the end of the year. The *t-statistics* and *tolerance* are presented in parentheses.

Variables' definitions and measurements are the same as summarized in Table (1).

*, **, and *** indicate significance at 0.1, 0.05 and 0.01, respectively.

5. Conclusion

This study aims to examine the impact of corporate governance mechanisms on the corporate cash hoarding. The study uses a sample from Borsa Istanbul over the period of 2010-2014. the study adopts regression analysis with year and industry fixed effects to test the research hypotheses. The study finds that firms with larger size of board of directors are more likely to hold more cash than firms with smaller board of directors. In addition, it finds that firms with larger percent of

independent directors their board of directors are more likely to hold more cash than firms with smaller percent of independent directors in their boards. It, also, finds that when the CEO of a firm is also the chairman, the firm tends to hold more cash. besides, the results indicate that firms with larger size of audit committee are more likely to hold less cash than firms with smaller size of audit committee. However, the study finds non-significant relationship between cooperate cash hoardings and both frequency of board meetings and family ownership. Further, the study finds that firms audited by non-big auditor are more likely to hold more cash than firms audited by big auditor. The results suggest that firms with good corporate governance mechanisms are less likely to hold cash.

this study has some limitations that can be considered potential areas for future research. First, the covered period is only five years. Considering longer time series period may be an avenue for future research which may provide indication on the cash hoarding behavior. Second, the study focuses only on cash hoarding in Turkish firms. Other countries, however, could have different approaches for hoarding cash. Investigating corporate cash hoarding in other countries, such as Germany or Gulf countries, could be useful in understanding the behavior of corporate cash hoarding. Third, the study uses limited number of corporate governance mechanisms. Considering other mechanisms such as existence of experience in audit committee or/and other ownership structure may be a potential avenue for future research.

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